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An observational study assessing the hydration status of recreational endurance athletes during a mountain marathon

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Changes in hydration status have been shown to have deleterious effects on mental decision-making, physiological functioning and temperature regulation, the latter an important safety consideration in the mountains⁽¹⁾. This pilot study assessed the hydration status of recreational endurance athletes taking part in a mountain marathon and the implications on performance and well-being markers.

Twenty participants (16 males, 4 females; ages: 18–72 years) entered in the Longmynd Hike [50 mile race; mean completion time: 16.0 (sd: 3.2) h] provided urine samples before and after the event. Anthropometrical measures; body temperature; physical and cognitive performance tests; and subjective ratings of well-being were collected/performed before and after the race. A post-race questionnaire provided information on water consumption data, incidents and symptoms experienced. All data are expressed as means (sd), statistical significance $P < 0.05$.

Urine analysis showed a mean increase in specific gravity of 0.013 (0.011) g/ml from baseline to follow-up [1.011 (0.008) g/ml; 1.024 (0.008) g/ml, respectively]. No significant differences in specific gravity of urine were detected between age groups or gender and no associations were found with body temperature, time taken to complete the race or physical performance measures. Change in reaction time scores showed a negative correlation with post-race specific gravity ($P < 0.05$), suggesting that hypohydration at this level does not appear to impair ability to carry out such cognitive tasks. However, a positive association was found between post-race specific gravity and subjective score of nausea ($P < 0.05$), and t -tests showed significant differences in post-race specific gravity between those suffering from stomach discomfort [1.032 (0.004) g/ml] and those not [1.022 (0.007) g/ml; $P < 0.05$], and those reporting an incident [1.024 (0.008) g/ml] and those not [1.017 (0.001) g/ml; $P < 0.05$].

Estimated water consumption (litres/h)	<0.25	0.25–0.5	>0.5–1	>1
Participants (%)	21.7	52.2	13.2	12.9

Fig. 1. Retrospective estimated water consumption.

These findings suggest that although changes in hydration status of this level may not significantly affect performance, they do impact on participant well-being. Of further interest is the data gathered on estimated water consumption. Recommended fluid intake ranges between 400 and 800 ml/h⁽²⁾. Figure 1 shows over 20% of participants reporting consumption less than this and over 12% more. Therefore, overhydration could also represent as a risk in some participants, particularly those moving at a slower pace.

1. Sawka MN (1992) Physiological consequences of hypohydration: exercise performance and thermoregulation. *Med Sci Sports Exerc* **24**, 657–670.
2. Noakes TD (2002) IMMDA AIMS advisory statement on guideline for fluid replacement during marathon running. *New Stud Athlet* **17**, 15–24.